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ABSTRACT

This buyers guide provides information on needs assessment, buying options, and decision making tips when acquiring a new school athletic track. Among the topics covered are developing a budget, choosing a site selection, choosing a track surface, developing working specifications, and selecting a contractor. Also explored is the question of hiring a consultant to assist in planning, building, or renovating a track facility. A sample track layout is included. Lists of information sources, design professionals, and related publications conclude the guide. (GR)

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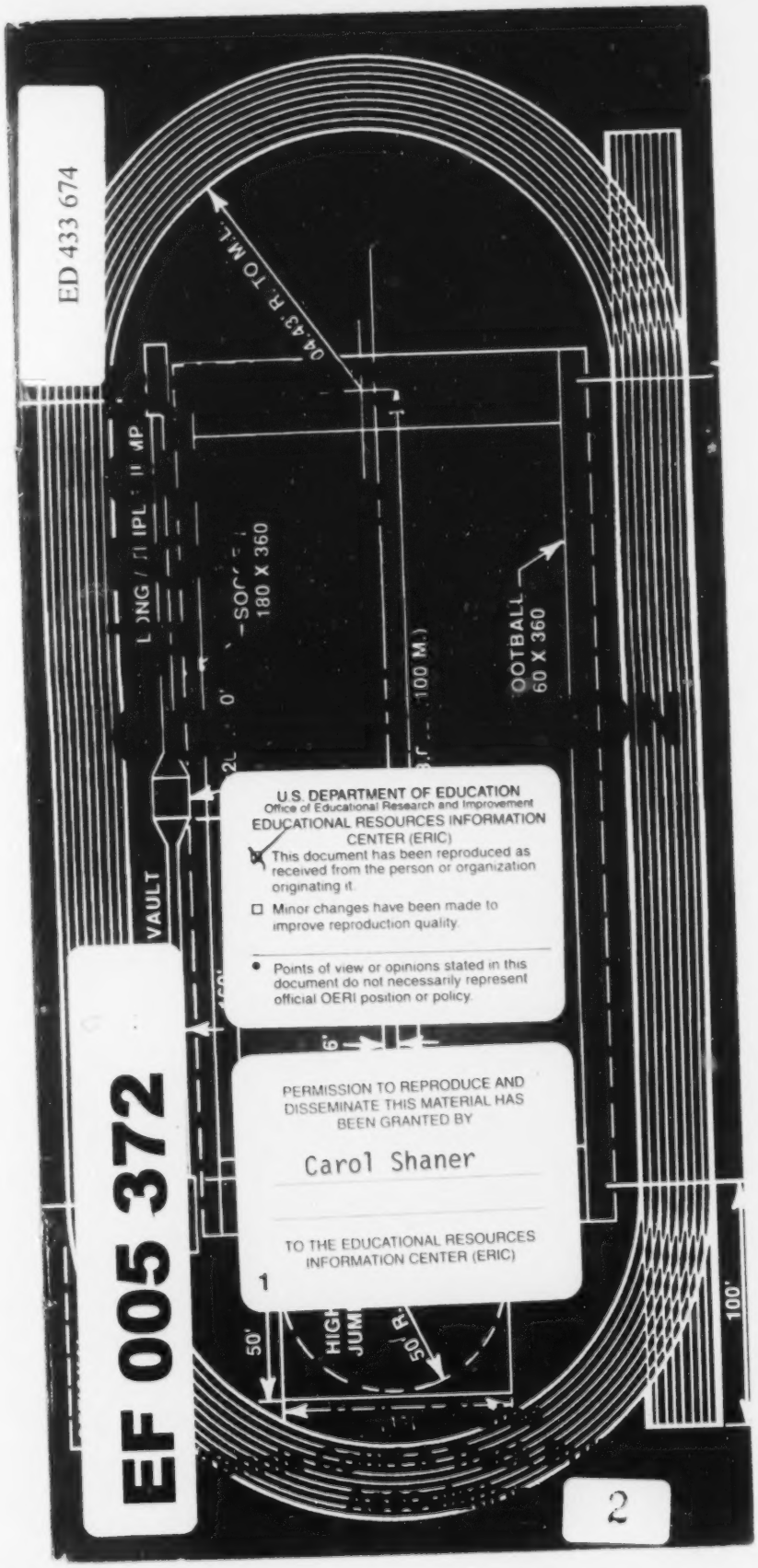
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The decision has been made: you want a new track. What comes next? Often the answer is confusion.
Building a running track can be a formidable task. Very few athletic facilities are as complex as a running track. Very few facilities offer as many acceptable options. With so many choices, no two track projects are the same. Each is a unique product of site constraints, owner preference, governing body rules, location, availability of materials and expertise, budget and other factors.

You need help defining your options and making appropriate choices. The United States Tennis Court & Track Builders Association (USTC&TBA) can help. Founded in 1965, the USTC&TBA is the trade association for builders, consultants and design professionals who specialize in the construction and maintenance of sports facilities, especially tennis courts and running tracks. Manufacturers and suppliers of materials, members of the trade press and others interested in tennis court and track construction participate as well. Its membership includes individuals and companies in the United States and around the world. Its goal is to encourage and to uphold high standards of tennis court and running track construction. To this end, the Association offers informative materials to those about to embark on tennis court and track construction projects. These include technical and consumer-oriented publications, including a series of construction guidelines which are regarded as the industry standards for tennis court and track construction. Information on obtaining these and other USTC&TBA publications is included with this Buyer's Guide.

1. Define your needs.

Long before you begin considering specific surfaces or contacting design professionals or looking for a qualified contractor, you should develop a clear definition of the project. The first step, then, in building a running track is identifying all the decisions that must be made in planning a track facility and learning what to expect from a track construction project. Basically, the success of a track construction project will depend on:

1. Proper site analysis;
2. Quality design and engineering;
3. Expert construction including construction of proper drainage, a stable base and a quality synthetic surface; and
4. Accurate marking.

This brochure will provide an overview of the track design and construction process and provide some basic information regarding the decisions an owner must make in developing a track project.

Early in the project, an owner must decide on the size and shape of the track being contemplated. A 400m track is the standard for all competition. Most competition tracks constructed today are six- or eight-lane tracks. A few high school tracks and many college or international tracks are nine or ten lanes wide.

There are two basic shapes for tracks:

1. A equal quadrant track has two 100m straightaways and two 100m curves;

2. A non-equal quadrant track has two straightaways of equal length and two curves of equal length, totalling 400m, but the straightaways are either longer or shorter than the curves, making a track in which the oval is slightly stretched or slightly compressed.

A third design is occasionally used, the broken-back track. This design features a more square track with shorter straightaways and rounded ends made of compound curves. This design creates a larger infield. It is useful for sites which cannot accommodate one of the more common track designs. In addition, it provides sufficient infield space for an NCAA soccer field, which is more difficult with the two common designs.

2. Develop a budget.

How much can you afford to spend? Developing a budget may be the most difficult step in the construction process. You may have to make some concessions, but in order to make informed choices, you should know what is important to you. Do you need a completed facility now or can you wait a while for field events, fencing and other finishing touches? Do you want a first class facility regardless of cost, or is cost a limiting factor? Are you absolutely certain about a given surface, or type of fencing, or specific site, or are you willing to consider substitutions? Once you see the number of options available in today's track market, it may be easy to spend far more than you had in mind. Working within a budget involves considering various alternatives and making choices, but choices don't have to mean compromising the end result. A knowledge of what factors are most important to the track you are planning and a desire to seek creative solu-

tions can bring the project in at a reasonable cost.

The USTC&TBA can supply a number of publications which can help you learn about these choices in order to assess your needs. A number of other professional organizations and trade magazines also can supply answers. See the reference section of this Buyer's Guide for suggested resources.

3. Consider a consultant.

It may be desirable to employ a consultant or design professional to assist in planning, building or renovating a track facility. Depending on the scope of the project, employing the services of an expert can actually help control job costs by better translating the needs of the owner into proper direction for construction, and by helping to avoid costly mistakes. A professional architect, engineer or landscape architect, or a knowledgeable contractor, trained and experienced in track construction, will help you identify your needs and refine the information to the specific requirements of your site. A consultant can assist you in determining the scope of work to be included in the job, in planning the facility, in determining a realistic budget for the project, in evaluating and comparing bids, in overseeing the work in progress and in solving any problems which occur during construction. Most Certified Track Builders (CTBs) also have expertise in the planning and design of track facilities.

In employing professional assistance, however, it is important to consider the experience of your consultant. Track construction is a highly specialized field which is undergoing constant change. It is important to employ an individual or firm with extensive current experience in the field of track construction.

How do you locate qualified professionals? One way to do so is by contacting professional associations such as the U.S. Tennis Court & Track Builders Association (USTC&TBA), the American Society of Landscape Architects (ASLA), the American Institute of Architects (AIA) and the National Society of Professional Engineers (NSPE). See the reference section of this Buyer's Guide for addresses of these organizations.

Another way to find a qualified professional is by contacting colleagues who have recently completed similar projects and asking for a recommendation. In any case, when you contact a prospective design consultant, be sure to ask questions about the firm's experience in track design. Ask about completed projects and past clients.

Contact references and visit completed projects. Ask for proposals and compare them carefully. Be sure you understand what is and what is not included in the proposed contract. Finally, once you choose a professional consultant, carefully negotiate fees and services and be sure to secure a signed letter of agreement or contract which clarifies all aspects of your arrangement.

4. Choose a site.

Where will you build? Is your proposed site appropriate for a track? Before you get too far along in planning, be certain that you have an acceptable site. In calculating the accuracy of a finished 400m track, no minus tolerance is acceptable and a plus tolerance should be small, preferably less than 2.5cm. These very small tolerances and the numerous design and site factors to be considered make track design extremely complex and demanding.

An experienced contractor or design professional can help you to assess your proposed site, but the following general considerations should be met:

How large a site is available? A track will require a site of no less than five acres, a minimum of 600' long by 300' wide. Additional area must be allowed for grading, curbs and drainage, and for facilities such as grandstands, bleachers, lighting, walkways, fencing, etc.

Will the track be built around playing fields? Most tracks are built around football and/or soccer fields. The location of these fields will add design considerations. In addition to allowing space for the field itself, space must be allowed for player seating, walkways, etc. Artificial turf fields require additional space for anchoring detail at the perimeter.

Will the track have a curb? Most high school tracks are built without curbs, but curbs are required to set NCAA and certain other records. A fixed curb may require additional area on the inside perimeter of the track.

There are a number of other important considerations in site selection.

- Does a potential site allow for proper drainage and storm water management? Water should drain away from the track. It is best to locate a track on a relatively level plain, higher than surrounding areas. Many tracks are built on low sites; however, additional filling or drainage work required by a low site may add substantially to construction costs. Even under the best site conditions, tracks should be constructed with an adequate inte-

rior drainage system to remove field irrigation overspray and storm water which may drain from the track and from the playing field. Proper drainage is an essential part of the track design.

• Is the site reasonably level? While the track will be sloped slightly laterally for drainage, for all practical purposes, the track must be level in the running direction.

• What type of soil exists at the site? Poor soil conditions often lead to problems with tracks, including excessive settlement, heaving due to the action of freeze/thaw and drainage problems. The best soil is hard, well-drained and non-heaving. Locations with peat, clay, topsoil, shear sand or other unsuitable materials at a depth of 8"-12" should be avoided, if possible. In practice, however, sites available for tracks are often sites which have been avoided in previous construction. These are sites with poor drainage, bad subsoil and other problems. Site problems, such as the need to establish a level plane or restructure the subbase, can be overcome with expert design and engineering, but this will add to the cost of the track.

• Is the site accessible for construction? Track construction requires the use of heavy equipment which must get to the site. The need to move or to avoid obstructions, such as fences, trees, buildings, grandstands and bleachers, may add to the cost of construction.

• Where are underground utilities (electricity, water, gas, telephone, sewer, etc.) located? While the finished facility will require utility service, it is far easier to avoid constructing the track over underground utilities.

• Where is the prevailing wind? A track facility should be built with straightaways parallel to prevailing winds. This is especially important for dashes and for hurdle races.

• Is the site accessible to the public? Are roads, parking facilities, walkways, bathrooms, water fountains, seating and other facilities adequate for spectators?

5. Choose a surface and develop working specifications.

An important choice in planning a track is the type of surface. Today, there are many choices. There is no right surface, but there may be a right surface for you, given your financial resources, type of usage, location, and maintenance capability. Learning about prospective surfacing systems and choosing the best system for your circumstances are the keys to long term satisfaction.

Natural material track systems, such as cinder and clay, used to be common. These tracks were relatively inexpensive to construct, but they had two major disadvantages: 1) they required constant and costly maintenance, including levelling, addition of fill material and re-marking; and 2) they were rendered soggy by rains, often causing postponement or cancellation of meets. In recent years, the growing cost of transportation of the materials used in these tracks has increased their cost to a point where they are not that much less expensive than more modern systems. Consequently, hardly anyone is building these tracks today.

The first modern track surfacing systems, the so-called all-weather surfaces, became popular in the late 1960's. Their development meant that, for the first time, systems were available which were durable and which were relatively unaffected by ordinary weather. Many of these systems consisted of a combination of rubber with asphalt emulsion, sand and asphalt, or roofing asphalt. These systems were called "asphalt-bound". Although many existing asphalt-bound tracks are still in use, like cinder tracks, these tracks are no longer being constructed in large numbers because their disadvantages are no longer balanced by a significant cost savings. Asphalt-bound tracks are affected by temperature -- they become quite soft in the summer heat and very hard in the winter cold. More importantly, asphalt becomes harder as it ages, so that despite its rubber content, an older asphalt-bound track may be no more resilient for runners than an ordinary street. At the same time, the cost of a sand-asphalt-rubber track has increased because it has become difficult to find an asphalt plant willing to manufacture the special mix required at an affordable price, since its manufacture requires shutting the plant down, producing the special mix, cleaning the plant equipment and restarting production of regular mix. Existing asphalt-bound tracks in good condition are often sealed to prolong their life. If an owner chooses to reconstruct the track with a more modern all-weather surface, an asphalt-bound track in good

condition can be used as a base, which significantly reduces the project budget.

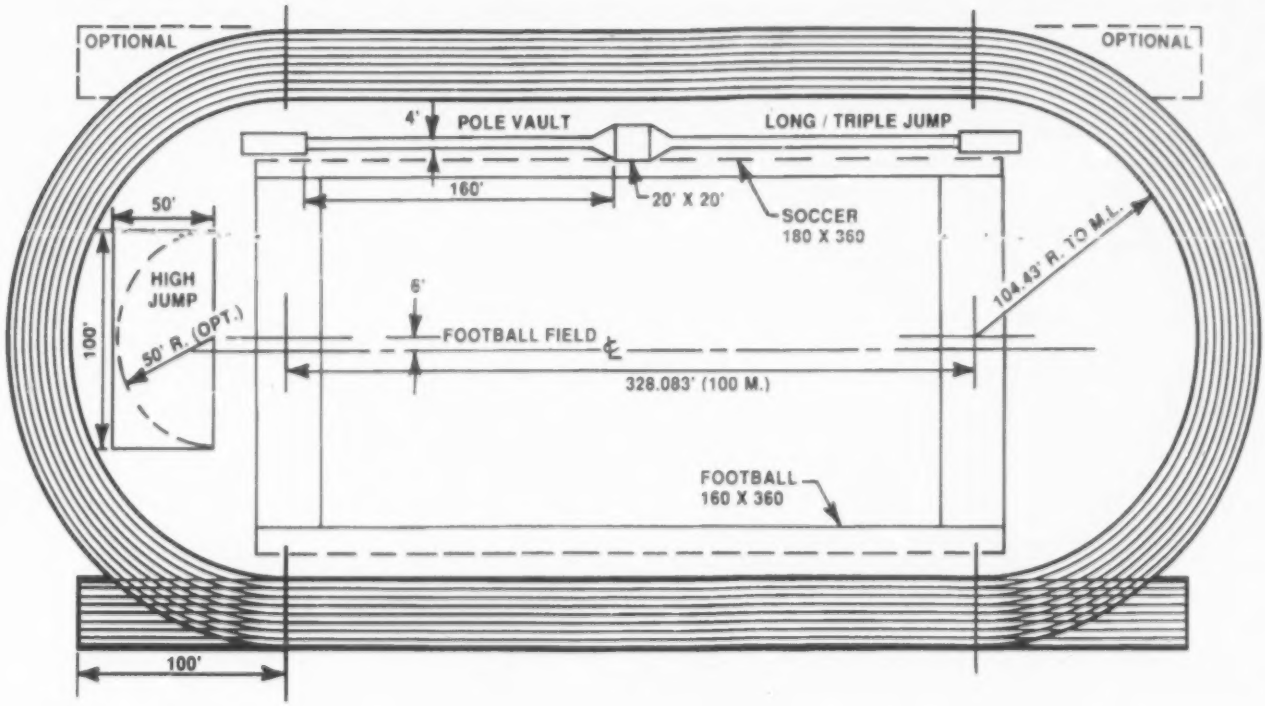
Today, most tracks are constructed of rubber particles bound with latex or polyurethane. The latex or polyurethane surface is installed to a depth of 3/8" to 1/2" on top of an asphalt or concrete base.

The rubber used may be black or colored. Black rubber particles may be granular or stranded and they may be made from natural rubber, styrene-butadiene rubber (SBR) or ethylene-propylene-diene rubber (EPDM), virgin or recycled. Colored rubber particles are almost always made of virgin EPDM rubber and they come in granular form only. The relative costs and performance characteristics of the types of rubber used are beyond the scope of this publication. A prospective owner should discuss the various systems available, their costs and performance differences with a knowledgeable advisor. In general, however, virgin rubber is more expensive than recycled rubber and colored rubber is more expensive than black rubber. When using recycled rubber, its quality and performance is dependent on the care taken in separating different types of scrap before grinding. The performance of any type of rubber is dependent on its chemical composition, the quality of its manufacture, its compatibility with the binder system and the care taken during its installation.

Latex-bound tracks provide good performance and durability, and have increased in popularity in recent years. Latex systems can be installed in multiple layers or in a single layer, creating a permeable, resilient surface. In some systems the rubber is spread over the track surface which is then sprayed with the latex binder. In other systems the rubber particles and binder are pre-mixed and then spread. Virtually all latex systems are permeable to some degree. The basic, and least expensive, system is black, but three types of colored systems are available. These are: 1) colored binder with black rubber; 2) color sandwich, which features colored rubber and colored binder in the top layers over black rubber; or 3) full-depth color, where both the rubber and latex binder are colored throughout the surface. Obviously, the greater the use and depth of colored binder and colored rubber, the more expensive the surface.

Polyurethane systems have been around longer than latex systems, and the solid-pour versions are often used on world-class competitive tracks. Polyurethane track surfaces can be either permeable or impermeable. They

SAMPLE TRACK LAYOUT WITH RUNWAYS ON BACK STRAIGHT



are generally mixed and installed on site, though premanufactured systems are available. Polyurethane surfaces may be colored or black. There are four types. The basic polyurethane-bound system consists of rubber particles bound with polyurethane to form a base mat. The base mat may be used alone, or it may be enhanced by the addition of a structural spray consisting of a mixture of polyurethane and rubber sprayed on top of the mat. This creates a textured surface. Alternatively, the base mat may be coated with a flood coat of polyurethane and rubber, creating an impermeable, textured surface. Or lastly, a full-pour system may be used in which each layer is mixed and poured in place. Full pour systems are impermeable and textured.

With so many systems available, it is important that an owner give a great deal of thought to choosing the best surface for a particular installation. Factors impacting that choice include initial cost, maintenance cost over the expected life of the surface, life expectancy, surface wear, repairability and performance characteristics. The assistance of a independent consultant may be particularly valuable in evaluating surfacing systems.

The USTC&TBA can supply additional information on track surfaces, their specific characteristics and maintenance considerations. See the publications order form included with this brochure for ordering information.

Once a surface is chosen, you should draft specifications. The more specific and detailed your specifications, the more likely that prospective builders will submit comparable bids. Specifications should outline the scope of work, including the subbase and base preparation, materials and hardware to be provided. Be sure to make clear in your specifications whether particular materials are required, or whether substitutions or equivalents are acceptable. Specifications also should detail the amounts of materials to be used. The USTC&TBA can provide construction guidelines for use in drafting specifications for a project. It may be advisable to utilize a design professional or consultant to assist in developing specifications.

6. Make specific choices regarding amenities and accessories to be included in your track project.

A fine track begins with a well-built base and a quality surface, but it doesn't end there.

Will the construction project include field events? Most

track projects built today include construction of a complete set of field event facilities: high jump pad, long jump/triple jump runway and pit, pole vault runway and landing area; shot put, discus and hammer throwing pads and landing areas; and, sometimes, a javelin runway or a steeplechase. Most owners want a complete project and it is more economical to construct all of these field events at the same time that the track is constructed than it is to have a contractor return and construct them at a later time.

During the design phase, the design team must consider where the field events will be located. Placing the field events in the infield of the track may facilitate spectator viewing, but may mean more traffic over the runways, and sideline congestion for football teams. This will mean more maintenance and a shorter lifespan. In addition, every effort must be made to design the jumping events with the wind for athlete safety; cross winds are particularly dangerous. Throwing events are preferably located so that participants are throwing into the wind. Likewise, for safety reasons it is essential that high jump and pole vault runways be located so that the athlete does not have to look into the sun or into artificial lighting. Event by event design considerations add significantly to the complexity of designing the overall project and have a significant impact on the size of site required.

7. Hire a qualified contractor.

Choosing the right contractor can determine the ultimate success of your track facility. A knowledgeable and experienced contractor can help you, the owner, make the right decisions resulting in a quality project. Track construction is a highly specialized field within the construction industry. It is vital that the contractor you choose be familiar with the current marketplace, as well as with the type of surface you intend to install.

How do you find a qualified contractor? One way is to contact the USTC&TBA. As the trade association for track builders, the USTC&TBA can provide a directory of its member contractors. In addition, the USTC&TBA conducts a certified builder program. Experienced contractors earn the Certified Track Builder (CTB) designation by completing a number of projects and by passing a certification examination. CTBs must recertify every three years. The Association also conducts an inquiry program, requesting information on your behalf from contractors and suppliers who have the answers to your questions.

Another way to locate such specialists is by contacting municipal facilities and schools which have recently completed track projects. Ask whether or not they would recommend their contractor and, further, ask some specific questions. Was the job completed on time? Did it meet the owner's expectations? Were there any hidden costs? Was the contractor able to solve any problems which arose during construction? If there have been any post-construction problems, was the builder responsive in taking care of them? How does the track look? How does it perform? Remember, both experience and reliability of the prospective builder are important.

Once you have the names of a few builder prospects, consider the following:

- How many years has the company been in business? If it is a relatively new company, what is the work experience of its principals? How many tracks have they built? Were they responsible for the complete project, just for surfacing, just for site work? Look for individuals or for a company with specific knowledge and experience in track construction.
- Does the company have experience in the type of project you contemplate? Look for a company with experience in projects similar in size and scope to yours.
- Ask for references and for a complete list of recent projects. If a significant project is omitted from the list of references, there may be a reason for that omission. Call references and ask questions. Determine as much information as you can about a prospective contractor's knowledge, experience, workmanship, ability to meet schedules, financial responsibility, and accountability. If possible, visit completed projects and talk to owners.
- Get references from design professionals, subcontractors, bankers and bonding companies.
- Ask about a contractor's insurance; have there been any major accidents or claims against the builder?
- Ask about awards and recognition. Has the contractor won any awards for his work? Is he certified or accredited by any trade organization?
- Check on lawsuits. If the contractor has been or is currently involved in litigation, find out the details. Check with your local Better Business Bureau, or with any local licensing agency, for consumer complaints.

• Ask to meet the individuals who will be involved with your project, particularly the job superintendent. Does the contractor/superintendent seem knowledgeable about measurements, orientation and marking of tracks? Does he understand grading, drainage, site preparation and base materials? Is he familiar with different track surfaces? Can he make recommendations regarding specific surfaces for your needs? Is he a Certified Track Builder (CTB) or a member of the U.S. Track & Track Builders Association? What is his current workload; can he realistically handle your project within a reasonable time frame?

• Consider communication. You want a contractor who listens to you and responds to your needs. You want someone with whom you feel comfortable, someone with whom you can establish rapport. You want a contractor who will build the facility you want, not one who will build his standard track and move on. You want a contractor in whom you have confidence. Don't underestimate the value of a good working relationship.

• Ask for proposals in writing and compare them carefully. Ensure that the bids, including products to be used and methods of construction, are equivalent to your specifications. What is included and what is not included in the contract price? Who -- contractor or owner -- is responsible for such items as permits, site preparation, electric power, taxes, insurance, removal and replacement of trees and shrubbery? Such items, while essential to the project, may or may not be included in the bid; whether or not they are included can significantly affect the contract price and the overall project cost. Even if construction materials and methods are identical and items included in the contract are consistent, look beyond price when comparing proposals. Compare proposed construction schedules, progress payments, and guarantees and warranties. Be sure that you understand what is included in any guarantee -- materials, workmanship or both -- and for how long. Is the warranty or guarantee backed by a bonding company, or if not, does the contractor have the financial ability and the reputation for backing up his work? Remember that an unbonded warranty is not a substitute for a quality installation by a reputable contractor. Rank the proposals and then

attempt to negotiate a contract with your first choice builder. If the bid of your preferred contractor seems high, try to negotiate a lower price or additional services into the package to make the higher bid more attractive. Remember, however, that price is not the only consideration. A project which is initially more expensive but which provides long term satisfaction and wears well is a good value.

- Once you have chosen a contractor, confirm your agreement in writing. The contract documents, signed by both owner and contractor, should be as specific as possible and should include, where appropriate, an agreement, conditions of the contract, drawings and specifications defining the scope of work including labor, materials, equipment and transportation to produce the project.
- Consider appropriate bonding, which may depend upon the size of the project. You may ask for a bid bond, a performance bond and/or a payment bond. Also, you may want to ask for a certificate of insurance as proof that your chosen contractor has adequate insurance coverage.

If you, the buyer, are to make the right decisions regarding a track project, becoming a knowledgeable consumer is the first step. Asking questions is not only smart, it is essential. The investment of time and energy now can yield a huge return in the future, in terms of a quality facility, and in the hours of enjoyment that will be derived from it. The USTC&TBA is committed to providing information to assist you in making informed choices in order to promote the construction of quality track facilities. For more information, contact the USTC&TBA at 3525 Ellicott Mills Drive, Suite N, Ellicott City, MD 21043-4547, or call 410-418-4875.

SOURCES OF INFORMATION

U.S. Tennis Court & Track Builders Association
3525 Ellicott Mills Drive
Suite N
Ellicott City, MD 21043-4547
410-418-4875
FAX 410-418-4805

Track Organizations

IAAF — International Amateur Athletic Federation
17, Rue Princesse Florestine
MC 98000 Monaco
011-339-3307070

USAT&F — USA Track and Field
One Hoosier Dome, Suite 140
Indianapolis, IN 46225
317-261-0500

NCAA — National Collegiate Athletic Association
6201 College Blvd.
Overland Park, KS 66211
913-339-1906

NFSHSA — National Federal of State High School Assoc.
P. O. Box 20626
Kansas City, MO 64195
816-464-5400

Design Professionals

American Institute of Architects
1735 New York Avenue, NW
Washington, DC 20006-5292
202-626-7300

American Society of Landscape Architects
4401 Connecticut Avenue, NW, 5th Floor
Washington, DC 20008-2369
202-686-2752

The Construction Specification Institute

601 Madison Street
Alexandria, VA 22314-1791
703-684-0300
National Society of Professional Engineers
1420 King Street
Alexandria, VA 22314-2794
703-684-2800

Publications

Track Construction Manual
Available through USTC&TBA

Construction Guidelines
Available through USTC&TBA

American Track & Field
16 E. Portola Avenue
Los Altos, CA 94022
415-949-2072

Athletic Business
1846 Hoffman Street
Madison, WI 53704
608-249-0186

HELP US HELP YOU WITH YOUR TRACK!

I am interested in:

_____ New construction
_____ Renovation of an existing facility

Location:

_____ Municipal/Public _____ High School
_____ College _____Other: _____

Approximate date work should begin: _____

Open for bids? _____ Yes _____ No

Design firm selected? _____ Yes _____ No

Contractor selected? _____ Yes _____ No

Need information on:

_____ Professional design or consultation services?
_____ Construction?
_____ Repair/Maintenance?
_____ Surfacing Systems?
_____ Fencing?
_____ Equipment?
_____ Other:_____
_____
_____
_____

Name:_____

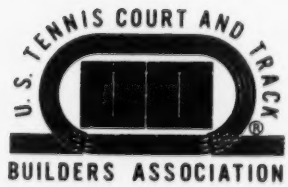
Company/Organization:_____

Address:_____

City:_____ State:_____ Zip:_____

Phone:_____ FAX:_____

The USTC&TBA makes no representation regarding the ability or performance of any individual member.



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